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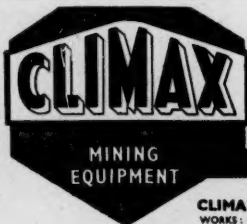
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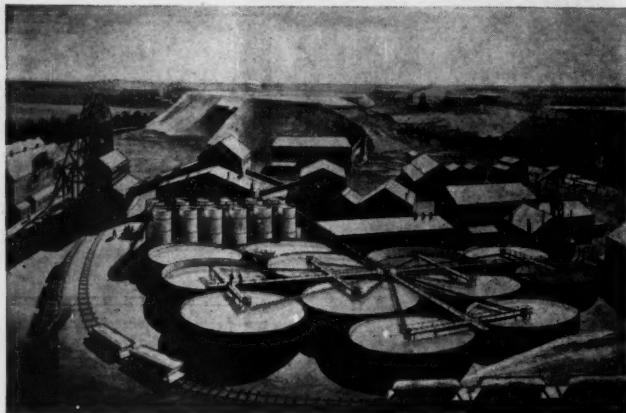
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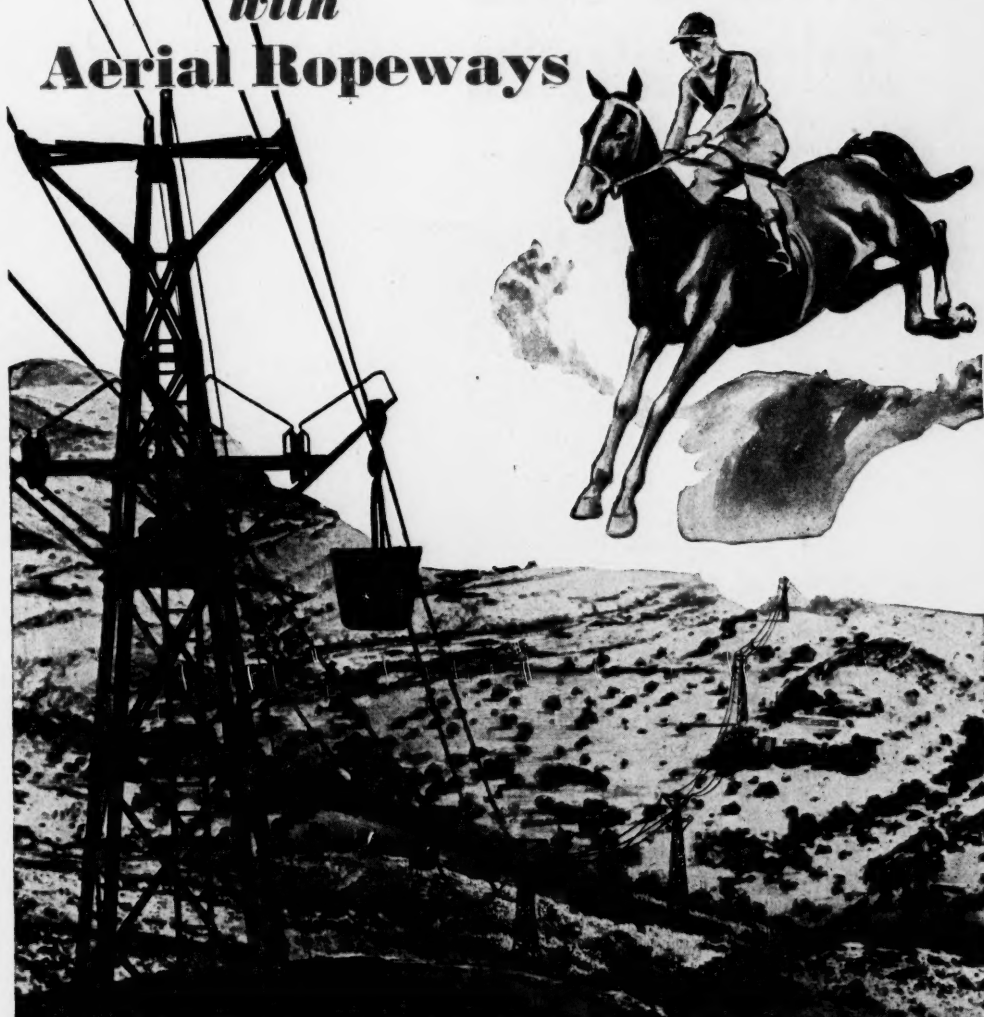
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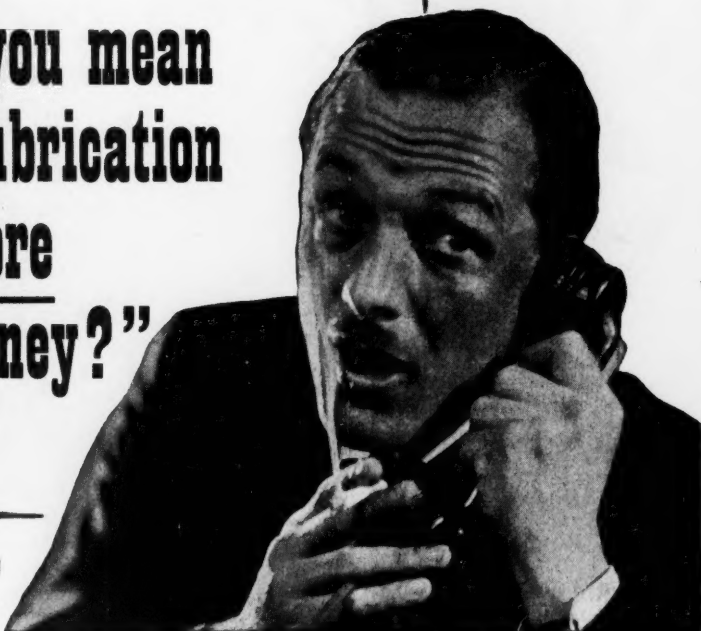
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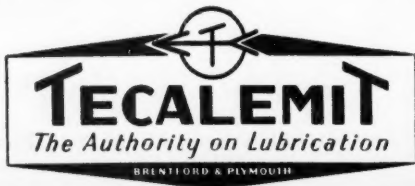
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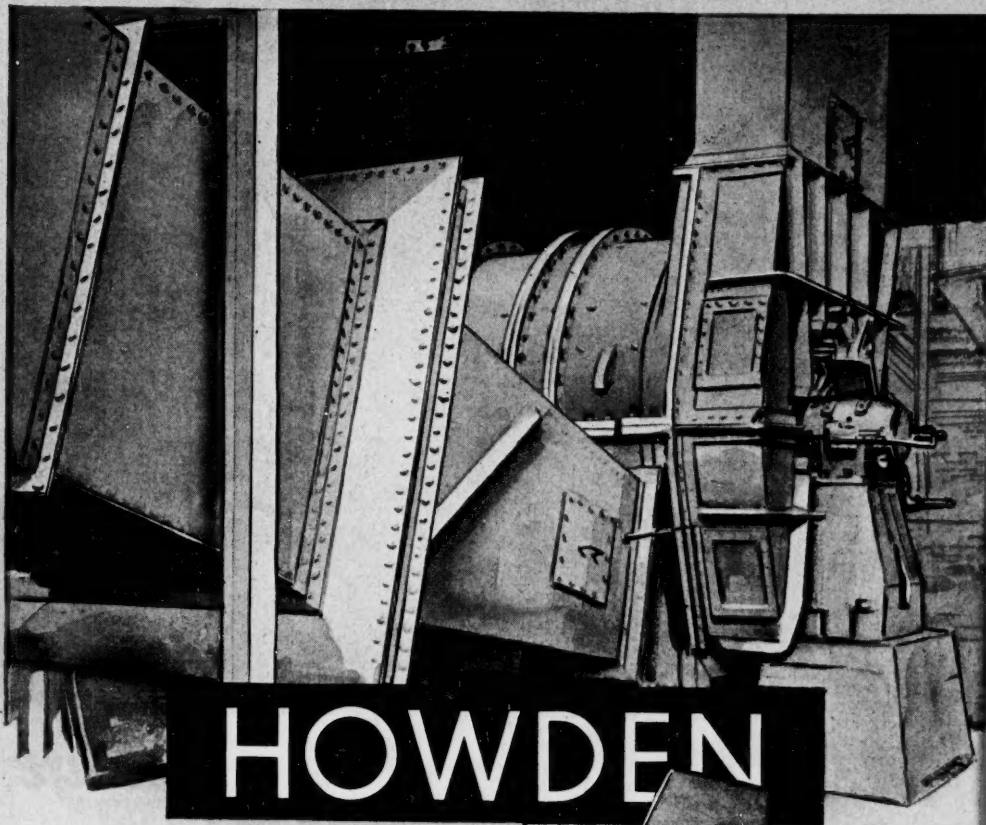


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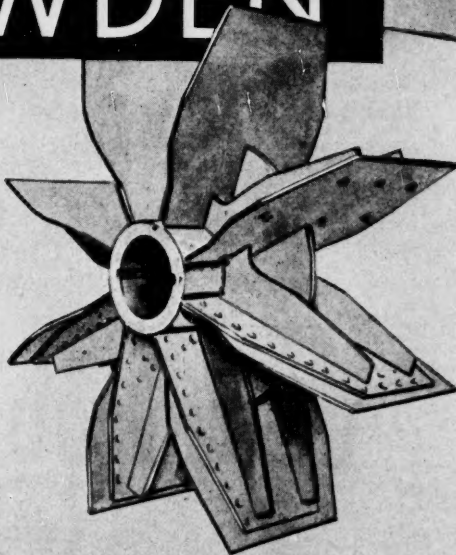
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THIS WEEK'S FEATURES

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NOTES AND COMMENTS

B.O.M.A., and the Dividend Freeze

The British Overseas Mining Association has written to the Secretary of the Treasury, urging that British overseas mining companies registered in this country should be excluded from the ambit of the Bill foreshadowed in the recent White Paper providing for the control of dividends during a three-year period.

The Association attacks the principal reason given by the Chancellor for the proposed Bill, pointing out that however bad the psychological effect of increased dividends paid to shareholders may be on the workers in this country, it is inapplicable to the workers employed by the British overseas mining companies.

But the Association has not allowed its case to rest on this one point alone, and it builds up a very strong case for exemption of mining companies everywhere and in particular, those operating overseas. The Treasury is reminded that mining is an expensive, speculative and lengthy business in its early stages during which time shareholders have a long and unremunerative wait. But even this implies that the mines will be successful, whereas in fact there are many failures. Therefore, if the premium on success is to be limited to a return to 5 per cent or 7 per cent on the nominal capital, it would represent far less after deduction of income tax than the amount required merely to redeem the capital. Thus the suggested limit would give no reward at all to the investors for their enterprise, much less any recoupment for failures in other mining ventures.

A number of practical consequences of dividend limitation are also listed. Risk capital, especially overseas capital will not be attracted to mining investments if there is little or no opportunity of recouping possible losses; limitation of dividends will fall heavily on marginal mines as continued investment would become a most unprofitable business. Furthermore, it will mean that companies will revert to mining a normal grade of ore, rather than, as now, when a policy of over-mining is in force in the interests of the Western world's defence needs. Prospecting too, will suffer to the advantage of competitors, controlled from financial centres elsewhere, thereby redounding to the further disadvantage of London as a world centre for the control of overseas mining.

In conclusion, B.O.M.A. requests the Treasury to exclude the industry from dividend control, and to make this decision public as soon as possible. However, from the

proposals contained in the White Paper, it would not appear that the Treasury could extend its power of allowing increased dividends to meet the Association's request for complete exemption from the dividend-freeze.

Yet, whatever the final outcome, B.O.M.A. has once more stated the case for the British overseas mining companies with a directness that calls for an irrefutable answer if the Government proposals are not to be stripped of every vestige of commonsense and to be put on view as another example of political expediency being put before the long term interests of this country.

New Mineral Deposits in Yugoslavia

Systematic exploration in Yugoslavia since the war has revealed the existence of many new mineral deposits. For instance, deposits of high-grade bauxite have been discovered between the Dinaric Alps and the Adriatic coast in Istria, north-western Yugoslavia. Their extent has not yet been estimated, but it is believed to be large, states a Reuter report from Vienna.

In Western Serbia, magnesite and fireclay have been discovered in large quantities. The magnesite deposits extend on a broad front from the middle stretches of the River Drina to Kosovska Mitrovica in the south and Gornji Milanovac in the east, and proven reserves are estimated at 7,000 million tons. Deposits of fireclay, discovered in the basin between the Bukulje and Kosmaj mountain ranges are claimed to be the largest in Europe. They lie immediately below the earth's surface and in parts are 20 metres deep.

A sinter magnesite plant is at present being built in the area of the magnesite deposits; known as the Magnohron factory, it will be the largest in South-Eastern Europe and one of the largest in Europe. Partial operation has already started and the larger part of the output will be exported. A fireclay factory in Arandjelovac, when fully in operation, will be able to cover the whole of Yugoslav requirements.

Substantial asbestos deposits have been discovered in Serbia, Macedonia and Bosnia-Herzegovina. The Germans built a large asbestos factory on the Kopaonik mountain during the war, but it was destroyed during their retreat. In 1947, it was rebuilt and extended.

Other deposits which Yugoslavia has already started to exploit, or intends to exploit in the near future, include important gypsum discoveries in Serbia, Croatia, and Macedonia, baryte deposits in Bosnia, quantities of mica—

said to be the largest in Europe—in Macedonia, and numerous graphite deposits in many parts of the Federal Republic.

Zinc in Finland

A new zinc deposit was discovered in 1950 at Metsämonttu, in the commune of Kisko, by Suomen Malmi Oy, a prospecting company in which the Finnish Government has a 30 per cent interest, states an article in *Mineral Trade Notes* of the U.S. Bureau of Mines. According to the results of preliminary test drillings, this area contains about 600,000 tonnes of ore with an average zinc content of 4 per cent. The deposit is only two kilometres from the Aijala copper mine of Outokumpu Oy., and the mining rights have been purchased by that company. Outokumpu Oy. plans to begin open-pit mining in 1951. Output is expected to be 60,000 to 70,000 tonnes of ore annually, from which 2,500 tonnes of concentrate will be produced. The concentrate will be shipped abroad for refining and re-imported as metal. Suomen Malmi Oy. received 24,000,000 Finnmarks in Government funds in 1950, principally for exploratory work in the Metsämonttu area, and an additional 20,000,000 Finnmarks has been appropriated for 1951 for further investigations in this area.

The Finnish Institute of Geological Research issued a report on the results of its tenth year study of a zinc deposit at Lampinsaari Island in the commune of Vihanti. Test drilling so far has revealed an estimated 700,000 tonnes of ore with an average zinc content of 6 per cent. The Institute will receive, in addition to its regular 1951 appropriation of 58,000,000 Finnmarks, an extra 25,000,000 Finnmarks, most of which will be earmarked for further investigation of the Lampinsaari deposit.

The Lampinsaari and Metsämonttu deposits, together with zinc obtained from the slag of the copper mines, may offer enough raw material for the establishment of a domestic zinc refinery.

Zinc-concentrate output in Finland declined from 5,111 tonnes in 1949 to 3,604 tonnes in 1950. Exports of zinc concentrates were 5,594 tonnes in 1950, compared with 8,299 tonnes in 1949. Imports of zinc metal totalled 4,319 tonnes and zinc scrap 7 tonnes in 1950, compared with a combined total of 3,253 tonnes in 1949.

Royal School of Mines to Celebrate Centenary

The Royal School of Mines is this year celebrating its centenary. Founded in 1851, as "The Government School of Mines and of Science Applied to the Arts," it first occupied buildings in Jermyn Street that had recently been opened by the Prince Consort to house the Geological Survey of Great Britain and the Museum of Practical Geology. The history of the school has been long and honourable and many famous pioneers of technological education have been associated with it. In honour of the occasion a number of functions has been planned by the Royal School of Mines Association, in conjunction with present students of the school and with the backing of the Governors of the Imperial College of Science and Technology, of which the Royal School is now part. The most important of these functions, perhaps, is a Centenary Banquet to be held in Drapers Hall on October 23, at which the president of the Association (Mr. Vernon Harbord) will be supported by a number of distinguished guests. On October 25 there is to be an evening conversation in the Royal School of Mines building, Prince Consort Road, S.W.7, which will, for the occasion, be taken over by the student body and used to illustrate the range of subjects now taught there. The art of mining has progressed far, through empiricism to scientific thinking, and in its progress the work of the Royal School of Mines and its alumni has played no mean part.

Australia

(From Our Own Correspondent)

Melbourne, August 1

The general improvement in Western Australia is cheering, but unexpected, as there has been little, if any, improvement in conditions affecting the industry. A case has been put by the State to the Commonwealth for the sale of gold on the open market; no decision has been reached, but it is stated that the Treasurer is impressed by the case put forward.

The need for beryl is directing attention again to the north-west of the State, where supplies were obtained during the war. The principal region of occurrence is at Wodgina, 70 miles south from Port Hedland, at Yinnie-tharra, in the Gascoyne country, and at Coolgardie; at the latter centre, it is found associated with massive feldspars. Production has been in the hands of prospectors and small operators.

SOUTH AUSTRALIA

There is much activity in this State in the search for uranium. The two main fields being investigated are Mount Painter in the Flinders Ranges, and Radium Hill, nearer to the New South Wales border. The latest work is being done by air survey over the Radium Hill country, by means of a scintillometer, and high readings have been reported. By this method, new sources of radio-activity have been located and ground exploration of these areas will be commenced later. The present survey has covered an area of 500 sq. miles, and it is proposed to extend the work over the Adelaide Hills, Wallaroo, Moonta, and parts of Eyre Peninsula. The Commonwealth Government will co-operate with the South Australian Government and carry out an aero-magnetic survey over the Radium Hill area.

QUEENSLAND

It is reported that Broken Hill South Ltd., which has been examining the Cloncurry copper field for some time, has purchased the Trekelano copper mine. The company has also taken options over the areas at Kuridala and Selwyn and will carry out prospecting on them. An authority to prospect has been extended, for a period of one year over an area of 300 acres at Mount Oxide. Diamond drilling will be commenced at an early date.

The Cloncurry copper field was one of considerable importance and promise at one time. Mount Oxide mine was noted for the large occurrences of oxidized copper ores, and their general high grade. This copper project undertaken by Broken Hill South will be helped by the recent increase in the Australian price for copper by £30 to £A260 per ton.

Golden Plateau N.L., which has been working low grade ore for a number of years, has reported the discovery of a high grade shoot. No statement of gold values has yet been made, nor whether the discovery is of an entirely new ore body or merely an extension of an occurrence hitherto worked. It is thought that the find may be of some importance.

In about 12 months' time, the State's tin production will be greatly reduced by the exhaustion of the present property of Tableland Tin, in the Mount Garnet district, and the dismantling and removal of the dredge to the new area will take approximately 18 months to complete the transfer and re-erection.

In the meantime, a new company is coming into production in the country back from Cooktown. This company is called Big Tableland, and the ground on which operations are being commenced is reported to be of very good grade, with a large sluiceable area.

Canada

(From Our Own Correspondent)

Winnipeg, August 21

Gold producers in Canada will focus special attention on the forthcoming meeting of the International Monetary Fund to be held in Washington Sept. 10 to 14. The expectation is that representatives of this country will demand the same concessions as have been granted to South Africa—namely, permission to sell 40 per cent of current gold output on the industrial market. Some of the more optimistic observers are pointing to reasons why gold should be increased in price to a level in proper relationship to the increase in value of general commodities. However, any such decision at the September meeting of I.M.F. would come as a very great surprise.

TOWARDS NEW OUTPUT RECORDS

Canada's mineral output for 1951 appears to be headed for another new high record. A general survey just completed by the representative of *The Mining Journal* discloses the fact that current mineral output in Canada is at a rate of very close to \$100,000,000 every 30 days. Petroleum output has risen to a rate of over 4,500,000 bbl. a month, a gain of more than 50 per cent above that of one year ago. Asbestos production has risen from a rate of 65,000 tons monthly a year ago to a current rate of over 90,000 tons per month. One year ago nickel output of Canada was at a rate of approximately 10,000 tons per month, compared with more than 11,000 tons monthly at present. Copper production is now at a rate of 25,000 tons compared with 23,000 tons per month one year ago. Substantial increases are also being recorded in the production of lead, zinc, and iron. Among the precious metals, gold is scarcely holding its own, and will show a decline due to the labour strike which has forced Hollinger Consolidated into idleness for the past five weeks. On the other hand, due to revival of work in the old Cobalt silver area, the output of silver is at a current rate of more than 10 per cent above that of the preceding year.

"URANIUM CITY"

Information emanating from Beaverlodge Lake, in the Athabasca Lake area of northwestern Saskatchewan, is sufficient to suggest a uranium producing field of considerable magnitude is in course of development. Spearheading the opening of the new field is Eldorado Mining & Refining (1944) Ltd., which company is owned and operated by the Canadian government. This company alone, with two central properties—the Ace group and the Fay—is undertaking a multi-million dollar development designed for initial handling of 500 tons of ore daily within less than two years, and with crushing facilities for 2,000 tons daily should development warrant expansion of output. A shaft on the Ace group is already down eight levels to a depth of 1,150 ft. Meanwhile, on the company's adjoining Fay group the site has been selected for a five-compartment shaft to be sunk as rapidly as possible to levels and depths corresponding with the adjoining Ace group. The plan is to connect the underground workings of both properties—giving outlet of ore through the large new shaft to the site of the new mill on the Fay group. "Uranium City" is the name selected for the model townsite which has been laid out at a point about eight miles from the mines. And while the Canadian government is thus placing its stamp of approval upon the outlook for production of uranium on a big scale from northwestern Saskatchewan, it is of no less importance that several other mining companies enlisting the help of public shareholders are also conducting exploration and

development work with good promise that additional uranium-producing mines will be developed in that new and hitherto little known area of Canada's northwest.

SEAWAY PLAN BLOCKED IN WASHINGTON

Construction of the deepsea waterway through the River St. Lawrence to the Great Lakes has been blocked by powerful lobbies in Washington. While President Truman himself, together with many other political leaders, have openly favoured the project, yet other influences associated with the transport systems of the United States have once more succeeded in blocking the participation of that country in the undertaking at this time. Meanwhile, suggestions have been made that the Canadian government might undertake the \$800,000,000 expenditure alone. However, with defence expenditure mounting sharply—and with steel, cement, and labour in short supply—the outlook is that the project will be shelved for at least another year.

The trend of trade is weaving an increasingly strong link between Canada and the United States in matters of trade and industry. Nearly 75 per cent of Canadian exports go to the United States at this time. Less than half a decade ago the United Kingdom ranked evenly with the United States in receipt of Canada's exports, whereas the U.K. rate has now declined to a point where it is only one-sixth as great as that going to the United States. The chief reason appears to be the diminishing raw products and natural resources of the United States—and the rapidly growing natural resources coming to light in Canada. It is a matter of deep regret among Canadians that a greater amount of natural resources of this country cannot be processed here—thus bringing the twofold benefit to the country of origin. In actual truth, the benefit of processing and fabricating raw products from Canada in the United States is enabling the United States to reap incalculable benefits—greater benefits perhaps than Canada itself derives from production of her own raw materials.

Portuguese Wolfram Situation

(From Our Own Correspondent)

Oporto, August 27

The answer to the question "What next?" in regard to the Portuguese wolfram trade, raised in your correspondent's last letter, has now materialized. It has been known here for some time that no import licences were being issued by the Ministry of Materials for wolfram from Portugal; neither were any export licences being granted from Portugal to the U.K. Last week, however, certain exporters were notified by the Export Licence Department here that they have been allocated a quota of X-tons for the U.K. Naturally cables were sent to the buyers for the Ministry of Materials, but the reply was that no bids were authorized for Portuguese wolfram. We are, therefore, left where we were.

Some small quotas have been granted for Sweden; beyond that the U.S.A. have a monopoly, and are taking advantage of that position. The E.C.A. have made some dollar advances to certain mines for development purposes. These advances—made to mines with a known output—savour more of an attempt at controlling a zone than of any expectation of greatly increased production. Nothing is known here regarding the General Services Administration agency's buying terms; just as we are in the dark regarding the terms of the Ministry of Materials agency—neither the U.K. nor the U.S.A. furnishing any sort of indication regarding the conditions under which they intend to buy. Moreover nothing is known here regarding exports to the U.K. after September.

Strategic Minerals Activity in Western U.S.

By LEROY A. PALMER

The period since the war has seen in the United States the inception of many large projects involving huge capital expenditures for production of the more common essential metals, but almost as notable, although on a much smaller scale, has been the development of the lesser known minerals whose importance is not generally recognized until some crisis brings about an awakening, too often rude.

In this class, the greatest interest has centred on uranium because of its unique position in the field, its scarcity and price and the lack of general knowledge pertaining to it. While there has been extensive development and exploration for uranium deposits, other essential minerals have not been overlooked, and there has been a pronounced revival of interest in other critical metals, particularly in tungsten; while other alloy metals, such as manganese, chrome, and antimony, are experiencing active development.

URANIUM DEVELOPMENT IN FOUR CORNERS AREA

Prior to Hiroshima uranium was practically an unknown metal from the commercial point of view. The only locality in the United States where it was known to exist in quantity to make its extraction profitable, and then only in connection with the associated vanadium, was southwestern Colorado and south-eastern Utah, part of the Four Corners Area where these states have a common corner with Arizona and New Mexico. This area is generally exceedingly rugged and inaccessible so only a small portion of it had been exploited—and that for vanadium. In recent years, exploration has shown the existence of both uranium and vanadium over a far greater area than previously known and steps have been taken to improve the transport situation.

The latest move is that the Utah State Road Commission has outlined a \$1,000,000 project to build and improve several hundred miles of road in Utah's portion of the area. This fits in with a \$10,000,000 project already under way to serve the entire Four Corners Area. As this locality is the greatest potential source of uranium in the country, Climax Uranium Co., subsidiary of Climax Molybdenum has erected a 150 ton mill at Grand Junction, Colorado, the nearest accessible railroad point. This mill is distinctive as it is the first to be erected in this country for the primary purpose of treating uranium ores. So far, such treatment has been for recovery of uranium as a by-product of vanadium or in vanadium mills converted to treat uranium. The Climax mill also involves a radical departure from previous practice. No detailed information is available but, briefly, the ore is ground and classified and then given a chloridizing roast. The calcine is leached giving a water soluble vanadium compound and a filter cake containing the uranium, which is subjected to an acid leach. Temperature and pH control are of vital importance to the successful operation of the process.

DISCOVERY IN SOUTHERN UTAH

Westerly from the Four Corners Area in southern Utah, the recently discovered district near Marysvale has had sufficient development to indicate that it will become an important uranium producer. Production is under way at some of the mines and the ore is being shipped to Salt Lake City where Vitro Chemical Co. has converted to uranium treatment a World War II plant originally built for the processing of aluminium ores.

Another interesting discovery has been made in the same part of the state at Silver Reef. In the early days of mining in Utah this district was noted for its high grade

ores of native silver occurring in sandstone as replacement of vegetable matter. The silver was associated with copper and now it is found that the copper is associated with uranium. Lessees have been shipping the copper-uranium ores to the Vitro plant and the deposit shows sufficient promise for the A.E.C. to be preparing to diamond drill it. Apart from the more advanced developments such as the above, there is a countrywide search for fissionable minerals. Numerous encouraging finds have been reported and there is always the possibility that some of these may prove of importance.

Since this article was written, Reuter reports that American geologists have discovered uranium in the Alma and St. Kevin districts of Central Colorado.

Mr. Oscar Chapman, the Secretary of the Interior, said the discoveries were important, "because they indicate the presence of uranium-bearing lodes in an area where uranium minerals previously were unknown."

Following World War II, tungsten prices dropped and the industry languished. Now, with Chinese supplies cut off, the need for domestic production is sharply realized and, as an encouragement, the government is supporting the market at \$63 per unit. Largest producers are Union Carbide & Carbon Co. at its Pine Creek mine in California and Nevada-Massachusetts Co. in Pershing County, Nevada. Union Carbide operates under difficulties as it is rugged country at great altitude with very severe winters. Recently it has completed a "low level tunnel" at an elevation of 9,300 ft., which will be the permanent working adit. Connection has been made with the upper workings, the highest of which are at an elevation 11,800 ft. The mill is being enlarged to treat 1,000 tons daily. Pine Creek is expected to supply 40 per cent of the domestic output.

Nevada-Massachusetts, largest producer in the country before the development of Pine Creek, was closed down when the present emergency arose, but is now in operation at its former capacity of 400 tons daily. In the same part of Nevada, Gatchell Mine, normally largest gold producer in the State, has practically ceased its gold operation and is concentrating on tungsten of which it has large deposits discovered in the course of development of the gold ores.

HIGH GRADE SCHEELITE DISCOVERY

A recent discovery of value is the Starbright in the Mohave Desert area of California—an extensive deposit of high grade scheelite amenable to surface operation. In north-eastern Nevada, in the Mountain City district, competent geological investigation indicates a mineralized zone extending over a width of two miles and showing numerous scheelite deposits. In addition to the above, there are numerous small producers, some of perhaps but a few tons daily, but in the aggregate making up a sufficient tonnage to warrant consideration.

Mineral County, Nevada has been the scene of much activity and there are now at least three 100-ton mills in operation in addition to active development of a number of properties. Kennametal Co. of LaTrobe, Pennsylvania, subsidiary of LaTrobe Steel Co. and Allegheny-Ludlum Steel Co., has purchased the property of Nevada Scheelite, Inc. at Rawhide. The mill is being enlarged to increase capacity by 50 per cent and a diamond drilling programme has been started. The entire output of Nevada Scheelite will go to the parent companies.

The United States has realized through two world wars that it is a "have not" nation as far as manganese is concerned. There are numerous small deposits of metallurgical grade, but the total output of these is insignificant in com-

parison with the demand. There are large deposits of low grade, but these run very high in silica with the latter so intimately associated with the manganese as to make the beneficiation of these ores a difficult and unsatisfactory process. More recently some progress has been made toward a satisfactory solution of the problem and the U.S. Bureau of Mines is now operating a pilot plant at Boulder City where there is an ample supply of power available from Hoover Dam. Two of the most important deposits of manganese are in this vicinity. One of these, at Artillery Peak, Arizona, is considered the largest in North America, with ore averaging 16 per cent manganese. It is now being extensively developed and the ore is being treated in the Boulder City plant. The other is the Three Kids deposit in Nevada not far from Hoover Dam. During World War II, the M. A. Hanna Co. operated the Three Kids deposit and built a large plant which proved to be a metallurgical success, but a financial failure. Now Manganese, Inc., subsidiary of Haile Mines of New York City, has taken over and is erecting a 1,200 ton mill which will utilize part of the old Hanna plant. The ore is of the same general grade as the Artillery Peak which is being processed to metallurgical grade at the Boulder City plant. The government has entered into a contract with Manganese Inc., for 700,000 tons of manganese over a period of ten years. Total price specified in the contract is \$41,250,000.

EXPANSION OF ANTIMONY OUTPUT

Another move to produce metal that is in short supply is the antimony operation of the Bradley Mining Co. at its Yellow Pine Mine in Idaho. Yellow Pine is unique in that while it has been a consistent gold producer over many years it was one of the leading tungsten producers during World War II and now is the first in the country to enter upon antimony production on a large scale, at the same time maintaining its rôle as a gold producer. The plant is of new design and treats 2,400 tons daily from an open pit operation. The mill makes two products, a gold and an antimony concentrate. A typical analysis of the latter is 0.60 oz. Au., 17.0 oz. Ag., 46 per cent Sb., 1.8 per cent As., 22.0 per cent S. The concentrate is dried and goes to a ten hearth Herreshoff furnace. In roasting 75 per cent of the antimony remains in the calcine and 25 per cent is volatilized and recovered in the bag house. The calcine and fume are mixed with suitable reagents and charged to a Lectromelt furnace. Furnace gases are bagged and the fume returned for retreatment. The metal is tapped every eight hours and sent hot to the refining furnace which consists of three 5 ft. x 7 ft. tilting reverberatories. The charge to the latter contains 5 per cent iron and 4 per cent arsenic which are eliminated in the furnace to a maximum of 0.05 per cent iron and 0.10 per cent arsenic. The final product analyses 98.5 per cent Sb., 0.06 per cent As., 0.05 per cent Fe., 0.6 per cent Cu., 5.0 oz. Au., 50.0 oz. Ag. This product is sent to a converter, similar in design to the refining furnace, where the antimony is oxidized and the gold, silver and copper concentrated in the converter bath. Oxide is reduced to metal by treatment in a furnace with 3 per cent soda ash and 10 per cent coal dust. As all of the plant output has found ready market as oxide, the reduction furnace is operated only intermittently when there is an accumulation of off colour oxide. Present capacity of the plant is 6,000 tons of oxide per year, but changes are under way to increase recovery and output.

The above is a brief outline to convey some idea of what is being done in the Western United States to improve the situation in critical and strategic minerals. There is not opportunity at this time to go into such major operations as Howe Sound's Calera mine and cobalt refinery or the many minor operations whose collective effort may well prove important.

Atomic Minerals in Brazil

(From Our Own Correspondent)

Teresopolis, August 20

In accordance with a decree-law of January 1951, the recently-created National Research Council will control all activities relating to atomic energy, including mining, transportation and transformation of source materials. The Council, in co-operation with the Department of Mineral Production (D.N.P.M.) and other technical institutions, will promote the investigation and industrialization of atomic energy and its applications, measure the known occurrences of source materials and direct the search for other deposits of economic importance.

The following materials, including the sub-products of processing, have been placed under the Council's control: uranium, thorium, cadmium, lithium, beryllium, boron, zirconium and graphite. Applications to export these materials, or any other ores containing more than 0.05 per cent thereof, must be submitted to the Research Council. In order to form stocks in Brazil exports of beryllium will not be allowed to exceed 1,500 tons to December 31. Exports of lithium have been prohibited.

Brazilian zirconium contains up to 1 per cent of hafnium, which can only be separated with difficulty, whereas that of Florida contains about 3 per cent of this undesirable element. John B. de Mille, in his book on "Strategic Minerals," refers to the Poços de Caldas reserves (see the *Mining Journal*, July 2, 1949) and to a deposit, seventeen metres thick, at Santa Cruz, in Rio Grande do Norte.

Cadmium occurs in the zinc mines of Adrianópolis, in Paraná, and between Apiaí and Iporanga in the south of S. Paulo. Other occurrences have been reported at Gonzaga de Campos, S. Paulo, in the municipality of Ouro Preto, Minas Geraes, and at Santa Luzia and Bomfim in Bahia. So far, none of these occurrences has been investigated with a view to commercial exploitation.

PROSPECTING IN THREE REGIONS

Prospecting is to be carried out immediately in three regions: (a) in the pegmatite zone of North-east Brazil, which embraces the known occurrences of beryllium and lithium, situated in Rio Grande do Norte, Paraíba and the adjoining States; (b) the coastal belt of Bahia, Espírito Santo and Rio de Janeiro, particularly the monazite reserves of beaches, river banks and the submarine platform; (c) the extensive chain of known deposits of heavy minerals in Minas Geraes.

D. Avelino Inacio de Oliveira, Director of the Department of Mineral Production, told the Press in July that the complex tin ores of the Sao Joao del Rei region are associated with uranium, lithium, tantalum, niobium and thorium. The D.N.P.M. has been authorized to call for tenders for the installation of plant to process tin ores at Sao Joao del Rei. It will be designed to produce ten tonnes of concentrates daily. Atomic and rare minerals will be recovered, or preserved, with the assistance of the local mining companies.

The President of the Research Council announced in August that Brazil's first atomic pile will be mounted in Minas Geraes.

In Espírito Santo, a Brazilian company is to instal plant to separate cerium salts from monazite sands. French and Swiss interests will subscribe 40 per cent of the capital. The company expects to extract cerium valued at £1,600 from each tonne of monazite, which has been shipped to the United States recently at £140 per tonne. Plant for the chemical treatment of monazite was inaugurated at Guarapari, Espírito Santo, in August.

The Deep Freezing Technique for Shaft Sinking

The deep freezing technique for shaft sinking adopted at Calverton Colliery has opened up new possibilities for mining engineers faced with the problem of sinking deep shafts in the presence of very large quantities of water. Many British and overseas experts visited the colliery while sinking was in progress.

The freezing technique is by no means novel. It was first employed in a South Wales colliery during the 1860's and the idea was developed by the Germans and adapted to lignite mining in 1883. It was used at Eastington in the first decade of this century and at Bullcroft about the same time. The scope of the process was, however, subsequently greatly increased by the discovery of the Campine coalfield in North-East Belgium, where the thickness of the water-bearing burden ranges from 1,300 to 2,000 ft. and there is no alternative to freezing.

Numerous applications of the freezing process took place in this country and on the Continent between the two wars and in a paper read in 1938 before the Yorkshire Branch of the National Association of Colliery Managers, H. E. Mussche and A. Varty described some of the outstanding applications of the process during the course of the preceding 10 years. These were the Houthaelen sinkings, Belgium; the sinking of the entrance and ventilation shafts of the Scheldt Tunnel at Antwerp; the King's and Queen's dock shafts at Swansea; the Moorbank sinking for the Hodbarrow Mining Co., Ltd., at Millom, Cumberland, and finally the Solway sinking for the Workington Iron & Steel Co. Ltd., at Workington.

The operations at Calverton colliery are of particular interest, both because of the large scale on which the deep freezing technique was employed, and also because its application to the particular geology encountered presented novel features.

OPERATIONS AT CALVERTON COLLIERY

The project was planned before the war by the original owners, B.A. Collieries Ltd., and in normal circumstances would probably have been completed before vesting day. In 1937 the company sunk No. 1 shaft at Calverton, the cementation process being successfully adopted notwithstanding the high water content of the Bunter Sandstone Measures, which sometimes exceeded 1,000 gal. per min. Because of the very large quantities of water to be pumped, and having regard to the physical strain imposed on men working in very wet conditions, the company decided to use the freezing process for sinking No. 2 shaft through the water-bearing measures, but it fell to the National Coal Board to carry out the proposed scheme. Essentially, the process consists of forming a collar of ice around the area of the shaft to be excavated. The base of the ice collar is fixed in impervious strata to form a seal against the inrush of water from outside the ice block, the area being finally closed in, if necessary, to form a solid block. Messrs. Foraky Boring & Shaft Sinking Co. of Nottingham were entrusted with this contract.

Boring began on January 1, 1947, but freezing operations had to await the completion of certain surface equipment and were not started till August 28, 1948. Boring the holes for the freezing tubes started on November 23 of the same year. Before boring these holes a fore-shaft was constructed in the form of a circular duct, 7 ft. wide and 7 ft. deep, and 33 ft. mean dia. This fore-shaft contains the main intake and return brine ring connecting to the ground pipes of the tubes in the freezing holes. On the circumference of the 33 ft. dia. circle, 25 holes were bored at 4 ft. intervals to a depth of 412 ft., their base being well in the Permian limestone. To avoid the formation of gaps in the ice wall, it was essential that all holes should be bored as vertically as possible. The holes were, therefore, surveyed by the Denis-Foraky Tecelelograph.

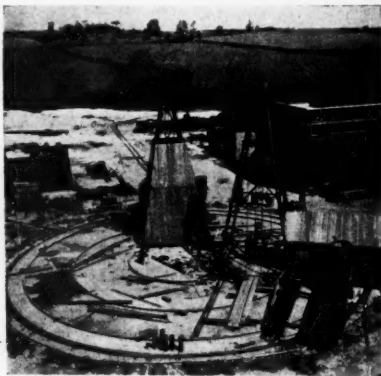
A trial hole 3 ft. off-centre of the proposed shaft was core-bored to a depth of 420 ft. and lined with perforated tubes. Examination of the cores enabled both the officials and the contractors to forecast the necessary measures to be taken during freezing operations and also to plan the application of the freezing process under the particular circumstances found at Calverton.

The total footage bored was 10,700 and the work was completed in 9 months. While boring operations were in progress, the refrigeration plant was being assembled. This consisted of three Haslem-Sterne ammonia compressors, each driven by an 80 h.p. motor and capable of 280,000 B.Th.U., three large condensers of the immersion type, and three brine coolers, together with two brine-circulating pumps. The condenser cycle was completed by a cooling tower supplied by the Premier Cooling Co.

The refrigeration plant consisted of two circuits. In the first, ammonia gas was compressed to approximately 120 p.s.i. and passed into the top of the condensers, emerging at the bottom as liquid ammonia under pressure. The liquid passed from the condensers through a regulating valve into coolers, where it immediately evaporated. The latent heat of evaporation was extracted from the second or brine circuit, the brine being passed through the coolers by the brine pump. The ammonia gas then passed to the ammonia compressors, where it was re-compressed ready for the next cycle. After the brine had been cooled, it was pumped down the 25 holes. Each hole was lined with $\frac{5}{8}$ in. thick freezing tubes, ranging from 3 to 6 in. diameter and sealed at the bottom. Inside these tubes were inserted an inner range of $1\frac{1}{2}$ in. dia. tubes with open bottoms. The brine was pumped down the $1\frac{1}{2}$ in. dia. pipes within the freezing tubes, after which it was passed back to the surface between the annular space formed by the two pipes. It was then pumped again through the coolers to maintain continuous circulation.

EFFECTS OF BRINE CIRCULATION

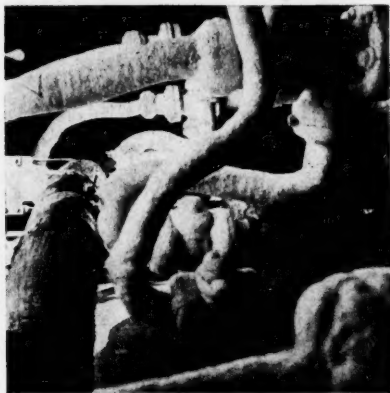
The effect of the brine circulation through the tubes was to form ice around the freezing tubes, the diameter of the ice columns round the tubes increasing until they came together to form a solid barrier of ice around the



Two brine rigs in operation at No. 2 Shaft, Calverton Colliery

area to be excavated. This frozen wall was then thickened. Any water trapped within the block as freezing proceeded was forced through the perforations in the lining of the trial hole and overflowed at the surface, thus indicating that the ice wall had begun to close.

The whole brine circuit system was tested to a pressure of 400 p.s.i. against leaks, since the escape of brine into the strata would have resulted in a considerable lowering of the freezing temperature.



Frosted brine ring, mains and connections at No. 2 Shaft, Calverton Colliery

The brine circulation was started on August 12, 1948, by pumping brine through the circuit at a temperature of -4°F ., the return brine temperature being approximately $+6^{\circ}\text{F}$. This process was in continuous operation until the final closing of the ice wall on October 12.

The shaft was excavated by crane to a depth of 52 ft., which was 8 ft. above the water level, the excavation for the fan-drift being simultaneously undertaken. From this depth concrete lining was placed and the fan-drift connection, headquarter foundations and shaft block were cast at the same time. The headgear was erected and, before the end of October, sinking from the 52 ft. level was begun.

Cutting through frozen strata at sub-zero temperatures presented both human and technical problems. At 100 ft. down it was found, as the work proceeded, that the air temperature was 22°F ., and the temperature of the walls 18°F . The pneumatic tools used for boring and rock breaking froze solid after working for two hours and had to be taken to the surface to be thawed out. During boring operations for shotfiring the moisture in the compressed air clung to the sides of the shotholes and froze, so that the drill-steels could not be withdrawn. This difficulty was overcome by pouring down the holes brine having a temperature of $+5^{\circ}\text{F}$. Another complication was presented by the concrete, which would not set well in a shaft temperature of 22°F .

THE HUMAN PROBLEM

On the human side, men had to work in conditions which resembled the interior of a giant refrigerator. As the master sinker put it, "if you slackened off you froze." The workers were supplied with thick flannel coats, heavy gloves, and $\frac{1}{2}$ in. heavy felt socks for their oversize boots. They also wore the string-type vests which proved their worth in cold zones during the war. Hot drinks were served every two hours and snacks half-way through each $7\frac{1}{2}$ hour shift. Three shifts a day were worked, each shift consisting of 12 men. There were eight experienced sinkers, the remainder of the men being inexperienced.

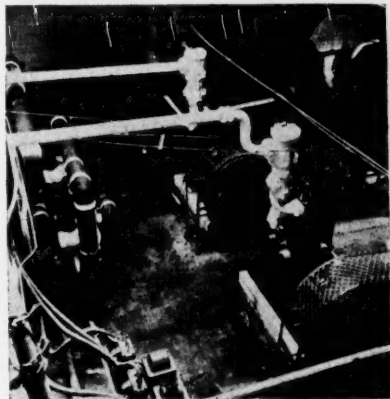
The sinking and boring engineer has praised the enthusiasm and interest displayed by the sinkers, but physical endurance must have been severely taxed by the very low temperatures to which the workers were subjected.

All these problems were satisfactorily overcome by raising the temperature in the shaft to 38°F ., using a heating technique which was developed for the National Coal Board by engineers of the General Electric Co. The equipment consisted of three standard G.E.C. 15 kW. factory heaters, each having a slow-running fan, which were attached one above the other to a special frame and slung from the surface. These units could be raised and lowered at will and were arranged to ensure an even distribution of warm air. The rise in temperature accelerated the rate of sinking by 10 ft. a week.

POSSIBILITIES OF APPLYING REINFORCED CONCRETE LINING

The shaft was lined with concrete, 20 in. thick, to a depth of 105 ft. Below this depth cast-iron tubing was inserted in four lengths in the frozen ground and backed by 9 in. concrete. The tubing was of the bolted internal flange type and was supplied by Head Wrightson Ltd. Cast iron tubing was used because of the great amount of experience which has been gained in its application where water under pressure is involved. Reinforced concrete with water under pressure has not yet been practised where high pressures are involved, but the application of reinforced concrete lining, if feasible, would result in an appreciable reduction in the cost of shaft sinking by the freezing method. This possibility is being borne in mind for future applications.

The freezing process at Calverton as applied by the Foraky Boring & Shaft Sinking Co. proved entirely successful. When the dangerous water-bearing zone was passed and lining operations had been completed to the required depth, the cold brine solution was replaced by a warm liquid to melt the ice collar. Thawing out was done slowly in order to allow the water-pressure gradually to build up behind the tubing, and was



Ammonia compressors, brine pumps and mains installed in No. 2 Shaft, Calverton Colliery

completed in July last year. Careful observation was kept for leaks when the pressure began to build up behind the tubing. As much as possible of the ice breaking away from the shaft wall was recovered and dumped on the surface in order to reduce the quantity of water formed at the bottom of the shaft.

The costs of sinking by the cementation system had to be related to present day costs, and to a shaft of

20 ft. 2 in. diameter, in order to give a direct comparison with the freezing system. On this basis, the cost per yd. all-in by freezing was £828, as against £499 by cementation, the difference being due mainly to the high cost of the cast-iron tubing. It has been estimated that the use of reinforced concrete lining in place of cast-iron tubing would have reduced the corresponding cost per yd. all-in for the freezing method to £540.

The procedure adopted at Calverton Colliery has been described in a paper presented on February 25, 1950, to the Institution of Mining Engineers by Alan Hill, F.G.S., General Manager of No. 6 National Coal Board area. Reference has also been made to the National Coal Board's journal, *Coal*, and acknowledgement is due to the National Coal Board for information and assistance in preparing this article.

The Uravan Mineral Belt

The U.S. Secretary of the Interior, Mr. Oscar L. Chapman, has released a report described as an important contribution to our knowledge of the carnotite (uranium) deposits on the Colorado Plateau. This report, entitled "The Uravan mineral belt," was prepared by R. P. Fischer and L. S. Hilpert of the U.S. Geological Survey, and has been released for public inspection in advance of formal publication to supply information needed by the prospectors in the area. It presents in preliminary form the results of intensive investigations made by the Geological Survey, and should serve as an important guide to private industry and governmental agencies seeking new deposits of radioactive materials. It describes the geology of a narrow, elongate belt in south-western Colorado where carnotite deposits have a closer spacing, larger size, and higher grade than those in adjoining areas. This belt, called the Uravan mineral belt, ranges from one to several miles in width, and extends from Gateway through Uravan to Slick Rock, a distance of about 50 miles. The Geological Survey began field investigations in the area in 1939, and since 1947 has been engaged in an active exploration programme on behalf of the Atomic Energy Commission.

The carnotite ore deposits in the Uravan mineral belt are clustered in favourable areas 1,000 to several thousand ft. wide and from one-half to several miles long. These areas are elongate at right angles to the local trend of the whole belt. The ground between groups of deposits contains few deposits, even within the belt.

GEOLOGIC GUIDES

The results of exploration and mine development in four areas in the Uravan mineral belt are shown by maps that accompany the report. In addition, the geologic features that are being used to guide the Geological Survey exploration are described, as are ways in which these features can be applied to guide systematic exploration of large areas. These geologic guides are particularly useful during the first stages of an exploration, when holes are drilled at a wide spacing. At such times the guides make possible the recognition of ground favourable for more intensive exploration, and eliminate ground where continued drilling would be fruitless.

Since 1947, the Geological Survey has drilled more than 500,000 ft. of diamond-drill holes in its exploration programme to find new deposits of carnotite ore. Most of this drilling has been in areas within the Uravan mineral belt.

Based on a general directive from the Atomic Energy Commission, the exploration work of the Geological Survey has the major objective of testing broad areas of unexplored ground away from known deposits, in order to explore areas that probably would not be tested by private enterprise because the deposits are buried deeply.

REVIEWS

Year Book of the American Bureau of Metal Statistics, 1951.—New York: A.B.M.S., 50, Broadway, New York. Pp. 112; 8½ in. x 11½ in. Price \$3.00 (post free).

The thirtieth annual issue for the year 1950 of this well-known year book, just published, covers largely the same field as previous issues. It comprises statistics relating to copper, lead and zinc, to other non-ferrous metals, and to gold and silver. The tables which have given this publication its world-wide reputation are compiled from the most reliable sources and convey much valuable information to all those interested in international mining economics.

Elementary Electrical Engineering.—By Albert E. Clayton and Herbert J. Shelley. Third Edition. 1951. London: Longmans, Green & Co. Pp. xi + 490. 5 in. x 7½ in. Figs. 340.

Electrification having been recognized as an important factor in mining, both mining students and engineers will find this textbook of great use. Broadly speaking, the subject matter covers sufficient ground to be suitable for any syllabus for the Ordinary National Certificate or Diploma in Electrical Engineering. The book includes an elementary treatment of D.C. and A.C. circuits, and of D.C. machines. The A.C. transformer measuring instruments, secondary batteries, distribution, electric lamps and illumination are also dealt with. In the third edition, the treatment of A.C. machines has been extended and some changes have been made in Chapter XV dealing with chemical effects, electrolysis, the lead storage cell, etc. Two chapters have been added, one dealing with general circuit theorems and the other giving a detailed treatment of series and parallel A.C. tuning circuits.

Fourth Empire Mining and Metallurgical Congress, 1949 Proceedings.—Edited by F. Higham, 1950, London: Published at the Offices of the Congress, 436, Salisbury House, Finsbury Circus, London, E.C.2. In Two Parts: xx-551 + xx-1139. Price £2 (the parts may be purchased separately at £1 each).

The long-awaited Proceedings of the Fourth Empire Mining and Metallurgical Congress held in this country in July, 1949, have now been published in the usual attractive form, the value of each volume being enhanced by numerous tables and maps (some in colour). These volumes are indispensable to all interested in mining, whether from the economic or the technical point of view.

Part One contains in addition to the Report of the Organizing Committee and Sir Henry Tizard's Presidential Address, papers on: Mineral Resources (Session AB); Modern Methods of Prospecting (Session C); Physiological and Psychological Effects of Heat and Humidity on Workers in Deep Mines and Metallurgical Works (Session D), and Petroleum (Session E).

Part Two includes papers on: Coal (Session F); Present Day Trends in Mineral Dressing (Session G); Metallurgy and Metallurgical Industries (Session H) and Evening Lectures.

Readers will recall that abstracts of a number of papers presented at the Congress were published in *The Mining Journal*, e.g., Sir John D. Cockcroft's paper on "Metallurgical and Mining Problems in Atomic Energy" (September 17, 1949); a paper by Mr. Anthony Caplan, entitled: "Effects of High Temperatures on Underground Workers on the Kolar Gold Field" (November 5, 1949); "The Electrolytic Zinc Industry," by Mr. Harry Hey (December 3, 1949), and Mr. W. B. Boggs' paper on "Modern Developments in Copper Pyrometallurgy" (January 13, 1950).

Engineering, Marine and Welding Exhibition

The following is a further description of exhibits of interest to those associated with the mining industry, shown at the Engineering, Marine and Welding Exhibition, taking place at Olympia from August 30 to September 13. Other exhibits were described in the *Mining Journal*, August 31.

Crossley Brothers Ltd.

Engines manufactured by Crossley Bros., Ltd., Openshaw, Manchester, are displayed on two large island sites in the Grand Hall. Four exhibits are shown on one of the stands, comprising Diesel power units up to 3,000 b.h.p. for marine, locomotive and stationary purposes. On the second stand are shown three large working models, including particularly a Crossley-Premier 16-cylinder 2,600 b.h.p. generating set, of which the full-scale version is too large to be accommodated on any stand in the show.

Rapid Magnetic Machines Ltd.

Rapid Magnetic Machines Ltd., Lombard Street, Birmingham 12 (Stand No. 15, Row G), who recently celebrated their Golden Jubilee, are exhibiting a wide range of electro and permanent magnetic equipment covering many industries. Amongst items of special interest are the company's range of permanent magnetic equipment, which include Permaflux drums and pulley type separators, also a new welding clamp, which is adjustable at all angles. Two typical types of swarf separators, which are also fitted with permanent magnets, are shown in operation. Electro-magnetic percolators for treating wet materials are also available for inspection as well as the Overband type separator, which is widely used in foundries for extracting iron sprigs from foundry sand.

Henry Wiggin & Co., Ltd.

The theme of this company's exhibit on Row G, Stand 2, is the history of nickel since its discovery by the Swedish scientist, Cronstedt, 200 years ago. A model of Cronstedt's laboratory will be on view. The classic papers on which the company's present products are based are shown against a background of uses and include the first description of the art of nickel plating, the first patents on nickel-chromium and nickel-chromium-iron alloys; original papers on the production of malleable nickel and the low-expansion nickel-iron alloys and material relating to the introduction of the nickel-copper alloys. Some typical examples of uses of the company's mill products in nickel and nickel alloys are shown.

The Brush Abco Group

Thirty engines, capable of supplying power for every type of need are displayed on a "double-decker" stand by the Brush Abco Group—the largest in the show. An outstanding feature is the new Mirrless JVSS16 Diesel. This engine is at present being exhibited at the Festival of Britain Industrial Power Exhibition at Glasgow and is being brought direct from Glasgow to London for the Engineering and Marine Exhibition. It develops 2,270 b.h.p. at 900 r.p.m. At the other end of the scale, one of the smallest of the engine exhibits is a 1½ cwt. Petter 1½ b.h.p. petrol or paraffin engine.

Also exhibited by Petters are their new "export only" completely self-contained Diesel lighting sets of 2½ and 5 kW. The sets come into operation immediately the first point is switched on and will maintain a steady supply at mains voltage for any load within their rating.

Throughout the exhibition, performances are being given of the group's film "Power," on the stand.

G. A. Harvey & Co. (London) Ltd.

Among the exhibits of G. A. Harvey & Co. (London), Ltd., Greenwich Metal Works, London, S.E.7 (National Hall, Stand No. 8, Row M), are Harco woven wire cloth in all meshes and gauges and in all metals. Of special interest are the Harco special quality wire screens used for vibrators. These screens give a far longer life in service under the most exacting conditions than ordinary mild steel.

General Refractories Ltd.

Exhibits at the General Refractories Ltd., Stand No. 12, Row F, cover the refractories requirements of all types of industrial furnaces. Basic refractories exhibited include a comprehensive range of magnesite and chrome-magnesite bricks for open-hearth, electric and reheating furnaces, cement kilns, etc. Another interesting display is that of the G.R. "341" Dolomite Bricks, manufactured entirely from British dolomite. A full selection of high alumina, sillimanite and carbon refractories is also exhibited.

General Electric Co., Ltd.

From the comprehensive range of AC welding plant manufactured by this company, portable single-phase and twin-arc welding sets are on view at Stand No. 6, Row V, Empire Hall. The portable twin-arc equipment, represents the most outstanding advance in A.C. welding plant in recent years and is the outcome of exhaustive experimental and development work which was undertaken with a view to producing A.C. welding equipment which would take a balanced three-phase load from the supply at a high power factor, without the additional expense of a power factor correcting capacitor.

Demonstrations of the operation of the twin-arc set are being given to enable direct comparisons to be made between the performance of this type of plant as compared with the more usual single phase equipment. For this purpose, simultaneous welds are being made by two operators using twin-arc and single-phase sets, and a continuous indication of their relative performances can be seen on an instrument panel. Arrangements are now in hand between The General Electric Co. Ltd., and The Quasi-Arc Co. Ltd., whereby the latter company will become the sole concessionaires for the equipment.

Broom & Wade Ltd.

On Stand No. 12, Row B, Ground Floor Grand Hall, Broom & Wade Ltd., High Wycombe, is showing its new Type—SV.220 portable, patented sleeve-valve air compressor plant. The compressor is of the water-cooled V type consisting of four cylinders arranged in two banks of two cylinders, and is driven by a 5 L.W. Gardner 5 cylinder Diesel engine developing 65 b.h.p. Actual delivered capacity 210 cu. ft. of free air per minute at 100 lb. per sq. in. pressure when running at 1,200 r.p.m. The plant is mounted on an all steel frame chassis of rigid design, with sprung axles and pneumatic tyred wheels and provided with draw bar and full trailer equipment.

Stationary Air Compressors and the popular C.M.C., combined Motor-Compressor Receiver—mounted and hand-carrying models are exhibited. A wide range of pneumatic tools including Hammer Drills, Road Breakers, Picks and Spades, Trench Pumps, Riveters, Rammers, Chipping Hammers, Drills and a Crankless Air Motor Driven Winch rounds this exhibition off.

Metals, Minerals and Alloys

Copper.—The disastrous situation threatening the United States industry as the result of the I.U.M.S.W. strike with its repercussions on the whole re-armament programme has impelled President Truman to order action under the Taft-Hartley Law to secure a Federal injunction against the strikers. Under this law heavy monetary penalties can be imposed on recalcitrant unions, as well as on individual miners, for failing to abstain from striking for 80 days after giving notice of a dispute. While the copper industry as a whole is primarily affected, lead, zinc, and tungsten operations are also involved to a lesser extent. What this union, which has been outlawed by the C.I.O., as well as members of the A.F. of L. may do remains to be seen. Agreement has been reached between the Kennecott and their employees at their Utah and Nevada plants to resume work on the basis of 15 per cent hourly pay increase and a $\frac{1}{2}$ c. an hour pension increase, and two-thirds of the men were back at work on Monday, and the remainder were expected to resume work on Tuesday or Wednesday. This seems to weaken the International Union's stand for acceptance only on an industry-wide basis. The other chief copper producers, Anaconda, Phelps-Dodge and the A.S. and R. Co., broke off negotiations with the International Union's officials early in the week. The object of the 80-days required by the Taft-Hartley Act was to give adequate time to explore all possibilities of a settlement, and the period thus imposed on strike action may enable a settlement to be reached. But it can hardly be on any basis less favourable to the miners than that agreed between the Kennecott Corporation and the Union. This certainly suggests an ultimate advance in the domestic ceiling of 24 $\frac{1}{2}$ c. Other organizations in the copper fabricating industry, especially the brass mills, are also involved, and their reaction must be awaited.

A spokesman of the N.P.A. stated that even if production were restarted immediately, it would take months before a normal movement of copper from the mines to consuming channels can be restored.

A general maritime strike has broken out at Chilean ports which will cut off supplies averaging about 30,000 tons a month to the United States so long as it lasts.

The growing world shortage of copper, and the resulting high prices with prospect of further increase, has led to a syndicate being formed in Australia to re-open the old Poona mine on the Moonta field, and claims are again being pegged over the Wallaroo and Moonta area, first opened in the '40s of last century.

Lead.—The effect of the I.U.M.S.W. strike has not been confined to copper. It is officially estimated that a continuation of the strike would reduce the lead output by 40 per cent, and the Munitions Board is being approached by the N.P.A. to release 25,000 s.tons from stockpile to keep defence plants running.

Canadian offerings of lead to the United States are to be resumed, according to Montreal reports. Canadian producers expect to obtain approximately the prices at present ruling for lead imported into the U.S., viz., 20 $\frac{1}{2}$ c. per lb. d.d. duty paid.

Tin.—Tin is the only one of the major metals which does not stand to be affected directly by the United States' strike turmoil. The prices have continued to fluctuate violently since our last, with the London price substantially higher than the Straits. It is generally believed that Bolivian producers under pressure from their government will agree to an interim contract covering June production at 112c. per lb., and an announcement in this sense is expected any day. The possibility of an extended

cessation of Bolivian shipments to the United States has given rise to speculations about the future of the Longhorn Smelter. According to some reports the smelter has sufficient stocks of concentrates to maintain its output for six to eight months. Should the hold-up continue, it is thought that the government may shut down the smelter and supply consumers out of the stockpile. The new Defence Materials Procurement Agency has now been formally created, with Mr. Jesse Larson at its head, but it does not seem to be expected that the administration policy of depressing prices will be reversed. When Governor Dewey visited Singapore recently, the various tin mining organizations are reported to have impressed on him that the Senate Preparedness Sub-Committee's original report was available, at the time of the Washington Conference in March, but that the delegates to the Conference were assured that it was regarded officially in the United States as thoroughly unreliable. Despite which, the R.F.C. accepted and acted upon it.

We understand that the International Tin Study Group has called a General Meeting in Rome on September 24, which, though officially a routine meeting, can hardly fail to take account of recent developments and their effect, especially Mr. Symington's inflammatory charges.

In Malaya the acting Chief Inspector of Mines has stated that his Department and the tin mining industry are engaged on an investigation as to the existing reserves of tin in the mine leases following recent warnings that they were becoming rapidly exhausted. He stated that all pre-war records had been lost and that 760 mines had been circularized asking for details on mine reserves and the expected lives of the mines, but the results cannot be collected for some time, and it remains to be seen whether individual interests will care to divulge information affecting their economic position, or give information to possible competitors.

Zinc.—The United States copper strike will, it is officially estimated, cut U.S. zinc production by approximately 65 per cent. The N.P.A. is being asked to release 25,000 s.tons to keep Defence plants running. The adoption of a two-price system as in copper is being considered. The recent meeting between the O.P.S. and the producers seems to have proved abortive, one producer being reported as saying that "nobody could agree upon anything, and the situation remains as confused as ever." Some producers claim that the new ceiling should be 19 $\frac{1}{2}$ c. or upwards, in view of increased production costs.

Aluminium.—The production of primary aluminium in the U.S. in July at 72,698 s.tons marks another increase on the upward progress of production in recent months and was the best monthly total since May 1944. Production during the first seven months totalled 476,290 s.tons, 18 per cent better than in the same period of last year.

Chrome.—The U.S. Government has announced a long-range buying programme to stimulate domestic production of chromite. The base price for lumpy ore, of which not more than 25 per cent must pass a 1 in. screen, and all must pass a 12 in. ring, will be \$115 per s.ton, while for fine ore and concentrates the price will be \$110. The programme will terminate on June 30, 1955, or as soon as 200,000 s.tons of concentrate have been accepted.

In a report on economic and commercial conditions in Pakistan, the former Senior State Commissioner in that country, Mr. Walter Godfrey, says "Pakistan is claimed to have in the Hindubagh area of Baluchistan the second largest chromite deposits in the world. Mining was started in 1941."

The Hindubagh range lies to the north of the Zhob valley area, from which substantial quantities of chromite were exported for a considerable period before the war. The output in 1936 was 21,089 tons, and in 1937, 27,164

tons. What discoveries have been made since the latter date we have no information but if the Survey means that since partition, big new deposits have been located, it would be very important news regarding what is to-day a scarce strategic mineral. As mining is said to have started in 1941, the inference is that these deposits were not known pre-war. Further information on this subject would be welcome.

Tungsten.—The I.M.M.S.W. strike is reported to have shut down nearly half the United States' production of tungsten concentrates. Some 400 employees of the U.S. Vanadium Company's Pine Creek Mill, which has been handling more than 8,000 tons of material monthly, walked out at the end of last month.

With tungsten under Government control there is nothing of interest to say of the market here. A small business in wolfram has been done at the control price of 525s. per unit c.i.f. or 520s. f.o.b. Our Portuguese correspondent's report on the wolfram situation there will be found in another column.

The London Metal Market

(From Our Metal Exchange Correspondent)

Prices of tin in the London market since last Thursday have fluctuated within comparatively moderate limits but the under-tone remains firm although the future course of the market is obscure.

There has been very little Continental enquiry, and the business concluded during the week has been meagre. Since the sharp fall in Singapore last Thursday, the tendency there has been mainly upward, and there seems to have been quite a good demand. Buying there is reported for European, Indian and South American account.

There is apparently no confirmation of the reported sale by the Bolivians of 30 days production of concentrates to the R.F.C. on the basis of a tin price of 112c., and it is presumed that negotiations are still in progress in regard to future supplies.

Stocks of tin in London Metal Exchange official warehouses for the week ended September 1, totalled 1,178 tons, showing a fall of 89 tons from the previous week.

The labour troubles which American producers of copper, lead and zinc are experiencing have so far had very little effect here, but might well be reflected in world markets should the difficulties be prolonged.

On Thursday the official close on the tin market was:—Settlement price £975, Cash Buyers £970, Sellers £980; Three months' Buyers £927 10s.; Sellers £930. In the afternoon the market was firm. Turnover for the day was 150 tons. Approximate turnover for the week was 535 tons.

The Eastern price on Thursday morning was equivalent to £927 17s. 6d. per ton, c.i.f. Europe.

Iron and Steel

Although available supplies of iron and steel fall far short of current requirements the producing plants continue to operate well below capacity. This, of course, is directly due to raw material shortages. Ferrous scrap is still very scarce, and little progress has been made in the building up of stocks of fuel for the winter. The position in regard to foreign ores, however, is much easier. Imports are coming freely to hand, there is an abundance of tonnage at the ore ports, and freight rates are appreciably lower.

Hopes of an improvement in the deliveries of home scrap are also running high. An offer of an extra £2 per ton is a substantial inducement to holders to clear out scrap and steel makers are confidently expecting that bigger tonnages of scrap will be forthcoming.

Thus the indications are that the industry has entered

upon a period of post-holiday expansion, but nowhere is the expectation entertained that supplies will overtake the overwhelming demand. On the contrary, a period of severe stringency is clearly at hand. Home consumers fear the curtailment of their activities through lack of steel, and this despite the fact that exports are now being curtailed.

The price of home produced billets is still substantially below Continental quotations but there is still an active demand for foreign supplies to augment home production.

Pressure for black and galvanized sheets is intense notwithstanding the recent advance of £6 per ton, and only limited tonnages are being released for export. Overseas demand for all classes of finished steel is in fact very active, and cannot be fully satisfied, in view of the mounting requirements of British industries.

SEPTEMBER 6 PRICES

COPPER

Electrolytic...	...	...	£234	0	0	d/d
Fire refined, high conductivity	...	...	£234	0	0	d/d
Fire refined, high grade	...	...	£233	10	0	d/d
Fire refined, ordinary quality	+	99.7%	£233	0	0	d/d
Fire refined, ordinary quality	+	99.2%	£232	10	0	d/d

TIN

(See Metal Notes above for Thursday's Metal Exchange prices)

LEAD

Soft foreign, duty paid	...	...	£180	0	0	d/d
Soft empire, including secondary lead	...	...	£180	0	0	d/d
English lead	...	...	£181	10	0	d/d

ZINC

G.O.B. spelter, foreign, duty paid	...	...	£190	0	0	d/d
G.O.B. spelter, domestic	...	...	£190	0	0	d/d
Prime Western	...	...	£190	0	0	d/d
Electrolytic and refined zinc	...	...	£194	0	0	d/d
Zinc (99.99% Zn)	...	...	£196	0	0	d/d
Sheets	...	...	£210	10	0	ex works
Zinc oxide (red seal)	...	...	£205	0	0	d/d
Zinc oxide (green seal)	...	...	£206	10	0	d/d
Zinc oxide (white seal)	...	...	£207	10	0	d/d

ANTIMONY

English (99%) delivered,	...	...	£390	per ton
10 cwt. and over	£305	per ton
Crude (70%)	£305	per ton

NICKEL

99.5% (home trade)...	£454	per ton
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OTHER METALS

Aluminium, £124 per ton.	Platinum (scrap), £27.
Bismuth, 27s. 3d. lb.	Platinum, £27/£33 5s. nom.
Cadmium, 18s. 9d. lb.	Rhodium, £45 oz.
Chromium, 5s. 11d. lb.	Ruthenium, £30 oz.
Cobalt, 17s. 6d. lb.	Quicksilver, £73 10s./£74
Gold, 248s. f.o.z.	ex-warehouse.
Iridium, £65 oz. nom.	Selenium, 25s. nom. per lb.
Magnesium, 1s. 6d. - 2s. lb.	Silver (bar), 78½d. f.o.z. spot
according to quantity.	and forward.
Osmiridium, £35 oz. nom.	Tellurium, 19s. lb.
Osmium, £70 oz. nom.	
Palladium, £8 10s. oz.	

ORES, ALLOYS, ETC.

Bismuth	...	...	50% 16s. lb. c.i.f.
	...	...	40% 14s. 9d. lb. c.i.f.
Chrome Ore—			
Rhodesian Metallurgical (lumpy)	£13	per ton c.i.f.	
" " (concentrates)	£13	per ton c.i.f.	
" " Refractory	£12	12s. per ton c.i.f.	
Baluchistan Metallurgical	£13	18s. 6d. per ton c.i.f.	
Magnesite, ground calcined	£26 - £27	d/d	
Magnesite, Raw	£10 - £11	d/d	
Manganese, Best Indian	(Nominal)		
Molybdenite (85% basis)	103s.	6d. per unit c.i.f.	
Wolfram (65%), U.K.	525s.	nom. c.i.f.	
Tungsten Metal Powder	35s.	nom. per lb. (home)	
(for steel manufacture)			
Ferro-tungsten	33s.	nom. per lb. (home)	
Carbide, 4-cwt. lots	£30	3s. 9d. d/d per ton	
Ferro-manganese, home	£39	17s. 1d. per ton	
Ferro-manganese, export	Nom.		
Brass Wire	2s.	7½d. per lb. basis.	
Brass Tubes, solid drawn	2s.	1½d. per lb. basis.	

Company News & Views

Mr. J. Ivan Spens Gives a Lead

"It is the intention of your board, when favourable opportunities occur, to invest some of the Corporation's surplus funds in investments other than in gilt-edged or in tin-mining projects," Mr. J. Ivan Spens, chairman of London Tin Corporation, stated at the company's annual meeting held earlier this week.

With the backbone of the company's income derived from dividends received from tin-mining companies, its fortunes, taking into account the tricky world situation which prevails to-day, are vulnerable to severe fluctuations. This is, no doubt, one of the principal reasons for the Corporation's investment policy being directed towards broadening the basis of its sources of income. It is an opportune moment as well for dividend limitation will have the effect of increasing the company's liquidity which is already impressive. At the year ended April 30, 1951, net current assets, taking investments at their book value of £2,886,007 (market value £4,590,005), totalled £5,531,647, which included cash at call and at bankers amounting to nearly £3,000,000.

In what type of companies London tin's board will decide to invest is in some ways, a minor matter. What is important is the way in which the Corporation's Board of Directors are coping with the situation in which most British overseas mining companies now find themselves. And it is to be hoped that we shall hear less of companies building up suspense accounts for shareholders and more about the way in which companies similarly placed intend to put their respective businesses on a firm financial basis.

The full text of the chairman's speech is reported on page 243.

Mufulira and Roan Profits Soar

The annual operating profits of Mufulira and Roan Antelope for the year to June 30, 1951, announced earlier this week are, by any standards incredibly good. Both companies experienced higher outputs, and greater sales at higher prices than a year ago. This more than countered the rise in costs and gave Mufulira a profit figure, before tax, of over £3,000,000 or nearly double that of the previous year while Roan's profit, before tax, at £6,275,000 was over two-and-a-half times that earned in the preceding year.

Mufulira	Mar. Qtr.	June Qtr.	Year ended 1950	June 1951
Production (l.tons)...	14,313	29,818	76,848	86,681
Sales (l.tons)	14,125	28,438	69,350	83,681
	£000's	£000's	£000's	£000's
Difference in value of copper stocks...	Cr. 91	Cr. 59	Cr. 345	Cr. 381
Revenue	2,635	5,276	8,761	14,846
Costs	1,140	2,131	4,149	6,049
Surplus	1,586	3,204	4,957	8,978
London Expenses ...	14	24	72	80
Replacements	175	175	700	700
Profit*	1,397	3,005	4,185	8,198
*Before taxation.				
Roan	Mar. Qtr.	June Qtr.	Year ended 1950	June 1951
Production (l.tons)...	17,573	20,599	63,557	74,520
Sales (l.tons)	18,273	20,599	62,059	74,520
	£000's	£000's	£000's	£000's
Difference in value of copper stocks...	Cr. 45	Cr. 22	Cr. 98	Cr. 115
Revenue	3,412	3,822	7,895	13,138
Costs	1,407	1,710	4,553	5,954
Surplus	1,960	2,134	3,440	7,299
London Expenses ...	30	34	108	124
Replacements	225	225	900	900
Profits*	1,705	1,875	2,432	6,275
*Before taxation.				

Often enough when such good results are obtained there is a feeling engendered in the investor that such good things must soon come to an end; yet unless there is a radical change in the world's demand schedules for copper, both companies can look forward to even greater earnings in the current year. In the first place the last increase of 3c. per lb. or £24 per ton has still to make itself felt in the earnings of the above companies as sales are contracted on a forward basis. Secondly, the supply position is very tight indeed, as is verified by the panic caused by the present copper strike in the U.S.A. and the fact that Continental buyers are paying as much as £400 per ton for the metal. Thus even if demand slows down (which is hardly likely as long as the present re-armament programmes are maintained) signifying greater supplies and lower prices, there is still a big gap between the "free market" prices and the prices at which Copperbelt companies are selling their product. Furthermore, Mufulira expects its new electrolytic refinery, capable of handling 36,000 tons per annum to come into operation next year and already stocks of copper are being built up in anticipation of this event. In fact, the real restraining factor on a further steep rise in output and profits is bound up with the question of adequate coal supplies which in turn is dependent on improved transportation facilities becoming available on the Rhodesian railways.

In the short run, however, assuming that the dividend limitation proposals become law the vastly improved earnings will not bring any concrete advantages to the shareholders in Roan or Rhodesian Selection Trust which owns 64 per cent of the Mufulira equity. On the other hand, when the three-year period is over copper-producing companies should find themselves in an immensely strong financial position.

The Brawn Age at Boulder

Gradually, the combination of penal taxation and inflation are strangling the mines which lay the golden nuggets. While this statement could be applied to any country in which British overseas mining companies are operating it has a particular validity in Australia. This is so because the inflationary spiral there has reached the point where marginal and near marginal mines must find some relief or shut down.

Mr. K. B. Edwards, chairman of Boulder Perseverance in his statement circulated with the accounts states that during the year to March 31, 1951, "inflation in Australia proceeded by leaps and bounds." The resultant increases in basic wages per five shift week have risen by £1 15s. 10d. to £11 0s. 5d. and together with the substantial rise in the cost of stores have left their mark on Boulder Perseverance and he speaks of an enormous financial drain on the company's resources caused by the inflationary movement. In particular it has rendered uneconomic tailings re-treatment and has brought about an acute shortage of labour—the turn-over of the labour force in Boulder's associated companies, being over 100 per cent.

The company's working profit for the year under review amounted to £52,109 out of which the Treasury took no less than 58.35 per cent, or £30,450. If the gross revenue of £340,267 is taken as the basis for the pay-out between labour and shareholders it will be seen from the accounts that labour received £154,727 equivalent to 45.47 per cent compared with £12,084 or 3.55 per cent to shareholders. In fact, skilled workers at the mines are now earning more than the members of the supervisory staff.

The financial results are compared with the previous 15 months and show that net profit, after tax, was £21,659 (£40,686—15 months). Dividend payments aggregated 10 per cent or half that paid previously leaving £6,838 to be carried forward.

South Kalgurli Maintains Its Dividend

Year to Mar. 31	Milled (s.tons)	Grade (dwt.)	Ore Reserves			
			Blocked out s.tons	Value	Probable s.tons	Value
1950	96,427	4.90	210,000	5.13	143,000	4.83
1951	101,736	4.74	209,000	5.17	144,000	4.87

The report and accounts of South Kalgurli Consolidated for the year ended March 31, 1951 calls for little comment. Technically the mining position appears to be much the same as it was a year ago. However, the tonnage treated was slightly higher, although the head value of the mined ore was slightly lower. In any event, the grade crushed was still comfortably above the value of the blocked out ore reserves.

Year to Mar. 31	Bullion Sales	Mining Costs	Net Profit	Tax	Divi- dend %	Forward Balance
1950	230,922	191,445	18,250	16,239	35	13,689
1951	264,614	225,121	14,379	18,500	35	13,407

Financial results show the effect of the inflationary movement continuing in Australia, and mining costs rose by £33,676, which absorbed all but £16 of the increase received from bullion sales. While the Company maintained its dividend payment at 35 per cent, the percentage earned on the issued share capital of £62,502 in shares of 5s. each figured at 34.2 per cent, thus leaving the forward balance slightly lower than previously.

Mr. Pearce on "Gouging" and "Cartels"

The results of the operations of Lahat Mines, whose tin-bearing properties in Malaya are let on tribute, showed a big improvement over the previous year. Although the better earnings attracted a much higher tax, profits available for distribution were substantially higher and the full benefits have been passed on to the shareholders in the form of three dividend payments aggregating 90 per cent on the 5s. shares, against 37½ per cent in the preceding year. The total distribution required a net amount of £14,550, and after transferring £3,739 (£41,000) to general reserve, the forward balance was left at £2,757, which compares with £1,743 previously.

Year to Mar. 31	Tribute Received	Gross Revenue	Tax	Net Profit	Divi- dend %	Forward Balance
1950	18,275	21,047	9,436	7,484	37.5	1,743
1951	52,851	55,443	31,166	18,894	90	2,757

Shareholders will be interested in reading Mr. E. V. Pearce's statement, circulated with the accounts in which he deals with recent accusations made by Senator Lyndon Johnson and Mr. Stuart Symington that tin producing countries were "gouging" in the U.S.A. and had constituted a "cartel." Mr. Pearce rebuts the latter charge by stating the fundamental fact that tin producers take no part in fixing the price for tin either on the Singapore or London markets; while on the question of "gouging" he poses the pertinent question: "what is one to think of the largest tin-consuming country in the world which, after clamouring for increased production from all countries (and getting it), and accumulates a very large tonnage for its 'stockpile,' then withdraws from the market because, regardless of conditions obtaining in the producing countries, it cannot purchase at its own price?"

During the year, 253 tons of tin concentrates were produced by tributaries against 230 tons in the preceding year, the bulk of the output coming from the company's Temple area, the further development of which, it is stated, is tantamount to opening up a new mine, and therefore

reduced output must be expected until this work has been completed. However, indications are that once this ground has been opened up, satisfactory outputs should be obtained.

Kinta Kellas—Bigger Dividend, Smaller Output

Terrorist activity, which is rampant in the Kinta district, Malaya, meant that operations of Kinta Kellas Tin Dredging for the year to March 31, 1951, were carried out under constant threat of bandit action. In addition to the insecurity conscious mentality which this situation engenders, further deterrents to increasing production by installing another dredge are the excessive costs of running the dredge and the penal taxation suffered. These points are featured in the address to shareholders circulated with the accounts by Mr. P. J. Burgess, chairman, who also pointed out that the tin duty for the first six months of the current year has brought £5,000,000 to the Malayan government's coffers as a tax on production itself, and not on profits.

Year to Mar. 31	Dredge Treated (cu. yd.)	Yield cu. yd. (lb.)	Output (tons)	Cost per ton £ s. d.	Price Received per ton £ s. d.
1951	1,243,200	.45	249	12 0 0	556 13 0
1950	1,610,649	.49	353	200 11 3	350 0 1

The above figures show that yardage treated, yield and output all declined compared with the previous year. This was due to the difficult nature of the ground treated which called for constant manoeuvring of the dredge to enable it to have straight runs. In view of the high prices obtainable for tin during the past year it was most unfortunate for even with the poorer results obtained, net profit increased from £11,207 to £15,689 enabling the distribution to be raised 5 per cent to 25 per cent. The carry forward was increased by £1,950 to £10,269.

Premier Consolidated Oilfields

Trinidad Consolidated Oilfields, formerly Premier (Trinidad) Oilfields has presented its report and accounts covering the first 15 months' operations in its new form. In July 1950, the company's capital was increased to its present amount of £339,209 in consequence of its amalgamation with Trinidad Consolidated Oilfields and the acquisition of oil and other rights connected with the Roodal Field in Trinidad from the National Mining Corporation.

During the 15 months' period ended March 31, 1951 the Chairman, Mr. P. A. Ashmead-Bartlett, said that no new wells had been drilled, but that the company had now reached the point when drilling needs to be re-started in order to maintain or, as is hoped, to increase the present output. Drilling will be carried out by Trinidad leaseholds and of the four wells projected one will be drilled immediately. Exploration costs, involving deep drilling, have risen appreciably and the expenditure programme in sight, therefore, calls for the building up of the company's finances and is the explanation for the transfer to general reserves of £75,000. At the fiscal year end, net current assets, including cash amounting to £171,167, totalled £181,131.

Net trading profit for the period under review was £99,033 which was augmented by an income of £60,683 received on account of previous sales of oil by the company and Trinidad Consolidated between August 1939 and June, 1948. This payment is, however, a non-recurring one and thus the net profit for the period excluding the oil receipts, was £84,033 out of which a dividend of 12½ per cent was paid requiring £22,261. The carry-forward amounted to £47,792.

LONDON TIN CORPORATION

MR. J. IVAN SPENS' ADDRESS

The Twenty-Fifth Annual General Meeting of London Tin Corporation, Ltd., was held on Monday last at The Chartered Insurance Institute, Aldermanbury, London, E.C.

Mr. J. Ivan Spens, Chairman of the Corporation, who presided, said:

The accounts of the Corporation and the consolidated accounts have now been in your hands for the usual period, and there is little on which I have to comment. The results show a further strengthening of the financial position and are, I hope, considered by shareholders as satisfactory.

I should point out to shareholders that in the profit and loss account the figures of taxation have been set out in a different form. In previous years the *net* figure has been shown after deduction of the amount of United Kingdom income tax recovered against losses incurred in the past. This year the full charge for taxation on the Corporation's profits has been set out and "U.K. income tax recovered" for the year to April 30, 1950, shown as a separate item. The Corporation's income tax "losses forward" are to all intents and purposes exhausted; accordingly the substantial recoveries of the last few years will not be repeated and the method now adopted makes clear the current year's trading only.

Shareholders will appreciate that the backbone of our income is dividends from tin mining companies and I shall have more to say on this subject later. With regard to tin mining companies, these are operating with equipment purchased in the years prior to the second world war and in ground acquired over the years since their inauguration. Equipment of this nature, while it can be and is reconstructed and modernized from time to time, cannot last indefinitely and replacements cost now probably not less than four times as much as in the period 1937-41. Reconstruction and modernization costs would be on a similar basis.

Actually, in the period 1937-41, seventeen dredges were reconstructed and modernized and five 18 cu. ft. dredges, four of which can dig to a depth of 130 ft., were installed for companies under the management of Anglo-Oriental (Malaya), Ltd. During the same period the companies in Nigeria under our management were equipped with a new dredge and several draglines and additional equipment was obtained following the occupation of the tin-producing countries in the Far East. Orders for additional earth-moving equipment of a new type to deal with harder ground have been placed and deliveries are expected to start before the end of 1951.

New alluvial areas, especially in Malaya, are difficult to obtain.

I am fully aware that in mining companies shareholders expect increased dividends when conditions are favourable to compensate for lower dividends when times are bad, and that many tin companies paid no dividend at all during the war years and the subsequent period while rehabilitation was under way. It would be imprudent, however, if directors were to adopt a dividend policy which took no thought of expenditure to be incurred in future to maintain the position and output of their respective companies. In certain cases provision has to be made in advance for road and river deviations, as well as the removal of dredges to new areas.

As the Corporation's accounts show, the general level of dividends from tin producing companies has shown a substantial increase, and I am confident that shareholders will regard as a source of strength the fact that at the same time reserves against the future have been accumulating.

INVESTMENTS

From what I have said already you will appreciate that wherever our influence can be brought to bear the policy is to build requisite reserve positions within the operating companies. In addition, the Corporation continues to build up its own reserves. It is the intention of your Board, when favourable opportunities occur, to invest some of the Corporation's surplus funds in investments other than in gilt edged or in tin mining projects. By so doing it is hoped that the basis of your corporation's portfolio will be widened and its revenue increased. The Memorandum of Association provides the necessary power.

PRICE OF TIN

During the year under review the price of tin has fluctuated violently. The price in the early part of the year was much lower than the comparable price of other strategic materials. But with the opening of the war in Korea a scramble for tin took place which forced the price temporarily in 1951 to levels in excess of anything which could have been foreseen. As the report of the "Preparedness Sub-Committee of the Committee on Armed Services, United States Senate," issued in early 1951, indicated price increases resulted from a frantic and

almost hysterical scramble for tin by domestic consumers and U.S.A. Government agencies.

Tin is, of course, sold on the open market in Singapore and London. Producers do not control the price, and there is no cartel whatsoever in existence. The price of tin depends on and responds to the common formula of supply and demand. In Malaya, especially, a high level of production has been maintained in conditions which obviously cannot be realized by those who disparage what has been achieved.

I do not propose to comment further on the Senate Sub-Committee's report or on certain statements which have appeared in the Press attributed to Mr. Stuart Symington, Administrator of the Reconstruction Finance Corporation, Washington, U.S.A., except to state that a large part of the report and the said statements are inaccurate and misleading. I would, however, refer shareholders to the comprehensive statement made by the chairman of the Malayan Chamber of Mines in London at its annual general meeting on July 11, which dealt with these matters and which was published in the Press.

In October, 1950, the United Nations Organization called an international meeting to consider a draft international agreement prepared by the Tin Study Group. This draft agreement set out to minimize the fluctuations in the price of tin and to produce a scheme for the future which would deal with conditions which would arise after stockpiling had been completed when the supply of tin exceeded commercial consumption. The conference, which I attended as an adviser, was adjourned as the views of the various countries differed to an extent which could not then be reconciled. Had it been possible to come to some such agreement as had been suggested, which was based on the principles of the Havana Charter, the result would have been beneficial both to consumers and producers.

Referring back to my earlier remarks and in regard to the question as to what is a fair price for tin, I must point out not only that operating costs have risen considerably but that present published figures do not yet reflect the full increases in costs. The costs of stores and supplies of steel nearly all of which have to be bought outside the countries where tin is produced are not reflected in the accounts until many months, probably up to two years, after the orders are placed. Stores are charged out to "operating" at the prices at which they were purchased, so that this time-lag on a rising market masks the full effect of the increases.

Moreover, it is obviously desirable that producers, especially in Malaya, Indonesia, Siam and Burma, should be in a position to place to reserve sufficient amounts to ensure that the finance is available for the various purposes that I have already indicated.

MALAYA

Conditions in Malaya have undergone no appreciable change since I last addressed you. The resettlement of squatters and regrouping of labour have been going forward steadily but it is yet too early to judge how far, and when, this is going to affect the issue with the terrorists. Schemes such as these must take time and it is earnestly to be hoped that an improvement in conditions will take place in the not too distant future. The emergency has now continued for over three years and the staff, both European and Asiatic, deserve our gratitude and appreciation for the way in which they have discharged their duties throughout this trying period.

Three more dredges under the management of Anglo-Oriental (Malaya), Ltd., came into production during the twelve months under review and three more are in course of rehabilitation. One dredge, which after rehabilitation operated on its old area for four years, has been moved to a new area and is now again operating.

Prospecting remains almost at a standstill and the need for its resumption on a large scale becomes more urgent as time passes.

Some war damage compensation claims have already been assessed and it can be hoped that the remainder will be dealt with at an early date.

BURMA

Conditions in the tin mining district of Lower Burma have brought mining to a standstill. European staff are, by Government order, confined to Tavoy town, and are not allowed on to the mines for security reasons. The Government of Burma has sent troops to the district but these so far have not been sufficient to do more than protect the townships. Conditions in other parts of Burma have improved and it is confidently hoped that more troops will become available to subdue the Communists who now terrorize the district.

It was with deep regret that we heard that Mr. H. G. End, who was acting district superintendent at Tavoy, was murdered by Communists while inspecting a bridge some 12 miles out of Tavoy town.

SIAM

Conditions in Siam have changed little during the year and the working of the mines there has been uninterrupted.

I am glad to say that a third dredge (the Tongkah Harbour dredge) started production in June, 1950.

A lump sum agreement for war damage compensation was arrived at between His Majesty's Government and the Siamese Government and war damage awards have now been paid. I would like to express our appreciation to H.M. Foreign Office here and to H.M. Ambassador and his staff in Bangkok for their great assistance in co-operation with the Association of British Commonwealth Mining Interests in Siam in getting this matter settled.

NIGERIA

Conditions in Nigeria showed no marked change. Production was adversely affected by the lack of rain and the curtailment of electric power supplies. The Government of Nigeria have increased the scale of royalties both on tin and columbite but seem oblivious of the fact that costs have increased and the increased price of tin in itself yields additional revenue. The position has been reached where the scale of royalties now payable to the Government is unrealistic with existing working costs. Protests have been made and figures provided and the Government asked to deal with the matter realistically but so far without response. With the price of tin at its present level and with these heavy royalties areas of lower grade ground become uneconomical.

DIRECTORATE

It was with great regret that we received from Mr. T. E. Baring his resignation from the Board of this Corporation. Mr. Baring joined the Board in 1935 when the affairs of the Corporation were being reconstructed and his advice throughout has been of great value.

STAFF

The Corporation has again been ably served in Malaya, Siam, Burma, Nigeria, Australia and London by the management and staff of its subsidiary companies. Anglo-Oriental (Malaya) Ltd. are responsible for some 40 per cent of the production of tin from dredging operations in Malaya, and 24 per cent of the whole of Malay's output. A. O. Nigeria Ltd. are responsible for 40 per cent of the production in Nigeria. Of the total tin production of the world the share of the companies under our management is 11 per cent, the mines managed by Anglo-Oriental (Malaya) Ltd. alone accounting for about 8 per cent.

I would like to pay tribute to all the staff and employees for the work they have done and continue to do, and especially to Mr. Warren, chairman of Anglo-Oriental (Malaya) Ltd., and to Mr. Wilson, chairman of A. O. Nigeria Ltd.

In Australia we have lost the services of an old and valued friend in Mr. H. A. Coates who was chairman of A. O. (Australia) Pty. Ltd. Mr. Coates was a prisoner-of-war in Malaya throughout the Japanese occupation and the strain of those years has had its effect on his health. He has our best wishes for a long and happy retirement.

The Report and Accounts for the year ended April 30, 1951, were adopted and the retiring directors re-elected.

GOLD MINES OF KALGOORLIE LTD.

PROPOSED FORMATION OF AUSTRALIAN COMPANY

SIR WALTER MASSY-GREENE ON DEVELOPMENT

The Annual General Meeting of Gold Mines of Kalgoorlie Ltd. was held on September 5 in Melbourne (the figures quoted are in sterling).

Sir Walter Massy-Greene (the Chairman), in the course of his speech, said:

The mill treated an average of 12,547 tons per four-weekly period as compared with 12,555 tons in the previous year.

The tonnage treated was 163,115 tons of which 163,108 tons came from the Company's leases and returned 42,670 ozs. of fine gold equivalent to a yield of 5.23 dwts. per ton. The gold realization, after meeting realization charges, averaged 65.05s. per ton of ore treated, an increase of 9.75s. compared with the year before. This is in part due to the increase of 0.16 of a dwt. in the grade of ore treated and in part to the increase in the price of gold which operated for the whole year at £12 8s. sterling or £15 9s. 10d. Australian, per fine ozs. Operating costs increased by 6.34s. or 16.76 per cent, to 44.16s. per ton. These costs include a charge for development redemption of 5.2s. per ton, against a comparable charge of 4.4s. per ton in the previous year.

The net result was that the profit before appropriation amounted to £163,848, being £23,986 more than in the previous year.

The interim dividend of 1s. 3d. per unit paid on April 9, 1951, took £76,844 and the proposed final dividend of 9d. per

unit will absorb £46,106, making the total dividends for the year £122,950, leaving a carry forward of £37,979.

Since the close of the period 3,281 ft. of development have been completed, of which 721 ft. have been in ore assaying 17.1 dwts. over 59 ins.

Reference was made in previous speeches to the South End and Second Quartz Dolerite prospects. For the South End prospect, as you have already been advised, a separate company has been formed. The first hole for testing the Second Quartz Dolerite prospect has been begun.

RISING COSTS

In common with all mines in Western Australia costs increased during the year, at G.M.K. by approximately 16.76 per cent, due to factors beyond the Company's control. This increase, consequent upon the rise in the basic rate, has continued. Not only does the rise in the basic rate effect the profit earned but it also results in tying up additional sums in working capital required by the Company.

PROPOSED NEW COMPANY

There will shortly be sent to Stockholders a letter giving full details of a proposal to place this Company in voluntary liquidation and to dispose of the whole of our undertaking for fully paid shares in a company to be formed and registered in Victoria, Australia. Subject to the necessary approval to the proposal by Members of the Company they will receive five shares of 10s. each (Aust.) in the new company for each four shares of 10s. each (English) held in the liquidating company.

The Report was adopted.

EAST RAND CONSOLIDATED

CURRENT PROGRESS

The Twenty-Fifth Annual General Meeting of East Rand Consolidated, Ltd., was held on September 4 at the Chartered Insurance Institute, London, E.C.

Major-General W. W. Richards, C.B., C.B.E., M.C., Chairman of the company, who presided, said:

FAR EAST RAND

Spaarwater.—The directors' report for the quarter ended June 30, 1951, shows a considerable improvement in the development results from the Spaarwater mine. In particular, the 37 Level West Haulage, which is being advanced in the direction of the West Spaarwater boundary, encountered 180 ft. of Main Reef assaying 17.8 dwt. over an estimated stoping width of 36 in., equal to 641 in.-dwt., and it is understood that this drive has continued in ore since the end of the quarter. Further development is necessary to determine the full significance of this discovery, but you will appreciate that on the Far East Rand, where the pay-shoots are usually persistent, such a result can be considered very encouraging.

The policy of continuing the present rate of development at Spaarwater is being adhered to and it is considered that the company's cash resources, together with the surplus of revenue over expenditure in mining and milling operations, will be sufficient to enable the company's large claim area to be adequately explored.

Witwatersrand Nigel.—I would also like to draw your attention to the favourable development results that continue to be disclosed by this company. The company is at present erecting a reduction plant to deal with ore that has been developed at the No. 7 Shaft (Poortje) Section. This plant, which will have an initial nominal capacity of 7,000 tons per month, is expected to come into operation early in 1952, after which considerably enhanced profits can be expected from the mine.

West Vlakfontein.—Drilling operations are in progress on boreholes W.V.3 and W.V.4 as previously stated. There is nothing further to report on these holes at the present time.

ORANGE FREE STATE

As will have been seen from the drilling report for the quarter to June 30 last, borehole B.H.1 on Farm Middelburg No. 246 (on the Iusti block of farms) failed to intersect the Basal Reef and drilling was stopped at a depth of 6,714 ft. Our consultants are studying the information gained with regard to future action.

The largest area of farms over which we continue to hold option contracts is that to which I referred at our meeting last year and which covers some 6,553 Morgen in the Bothaville District, taken up in conjunction with Anglo Rand Mining and Finance Corporation, Ltd. Borehole N.K.R.1 was drilled earlier this year to the southwest of Viljoenskroon with inconclusive results. We have not yet participated in any further drilling operations in this area. Until such time or until we participate in drilling operations in other parts of the O.F.S. publication of quarterly drilling reports will be suspended.

SOUTHERN RHODESIA

Falcon Mines.—As stated in my review we have increased our share holding in Falcon Mines, Ltd. That company continues to earn satisfactory profits from the Sunace and Bay Horse Mines, and in addition a small pilot plant at the Dalny Mine came into operation in December of last year and has earned profits since February of this year.

As a result of these operations the company's profit for the first nine months of the current financial year amounted to £37,945. In accordance with the company's announced policy these profits are being utilized to assist in bringing the Dalny Mine to full scale production, which is expected to be reached early in 1952. After this has been achieved we can expect to receive regular dividends from that company.

Olympus Consolidated Mines.—Recently a gold-mining property was offered for sale to us and to our associates. Following favourable reports from the consulting engineers in our organization, Olympus Consolidated Mines, Ltd., was registered in Southern Rhodesia to acquire the property, and we have taken a leading interest therein. The property comprises 14 blocks of claims covering a line of strike of 16,000 ft. in the Mtoko district of Southern Rhodesia. A further five blocks of claims have been pegged.

The results of development in the two months since acquisition have been very encouraging. The total footage advanced was 245, of which 190 ft. were on reef and sampled. Of this, 155 ft., equal to 82 per cent, were payable, averaging 7.2 dwt. over a channel width of 54 in.

Preparations are being made to start milling operations on a small scale and it is anticipated that production will be started before the end of this year.

TRINIDAD OIL INTERESTS

I am pleased to be able to report that Premier Consolidated Oilfields Ltd. has recently announced a maiden dividend of 12½ per cent, less tax. This company should yield an increasing return on our investment.

The Report and Accounts were adopted.

Mining Men and Matters

Mr. Vernon Harbord has been elected president of the Institution of Mining & Metallurgy for the Session 1952/53, in succession to Sir Lewis Fernor. Mr. Harbord was educated at Tonbridge School from 1908 to 1913. The outbreak of war interrupted his studies at King's College, Cambridge, and on demobilization, instead of returning to Cambridge, he went to the Royal School of Mines, obtaining his A.R.S.M. in metallurgy and the Bessemer Medal in 1920.

From 1921 to 1926, he was with the South Durham Iron and Steel Company, becoming general metallurgical adviser on foundry work; also in charge of special work at the Ormsby Ironworks—the foundry department of the company. In 1926, he joined the firm of Messrs. Riley, Harbord & Law, consulting metallurgists, founded by his father and the late Edward Riley in 1905, of which he is still a partner, the other partner being Mr. E. F. Law. During the last 18 months of the 1939/45 war, he was engaged as metallurgical adviser to the Armament Research Department.

Mr. Harbord is a Fellow of the Royal Institute of Chemistry and the Institution of Metallurgists and a member of the Iron and Steel Institute and the Institute of Metals. He has served on the Council of the Institution of Mining and Metallurgy since 1940 and held the office of vice-president for the period, 1947/50.

The Institution of Mining & Metallurgy has announced that the general meeting scheduled for September 20 will now be held on September 27. The paper to be discussed at the meeting will be "Work in High Temperatures in a Fire in Mysore Mine, Kolar Goldfields," and the author, Dr. W. B. Roantree, expects to be present to introduce his paper.

The dates of the Institution's future meetings, which are held on the third Thursday in the month are as follows: October 18, November 15, December 20, January 17, 1952, February 21, March 20, April 17 and May 15.

Transvaal Chamber of Mines have announced that at the annual meeting held in Johannesburg, Mr. S. R. Fleischer was elected president of the executive committee, and Mr. W. H. A. Lawrence and Mr. R. B. Hagart were elected vice-presidents for the current year.

Members constituting the remainder of the executive are the following: Sir George W. Albu, Mr. C. B. Anderson, Mr. P. M. Anderson, Mr. B. L. Bernstein, Mr. W. M. Frames, Mr. P. S. Hammond, Mr. H. C. Koch, Mr. C. S. McLean, Mr. S. G. Menell, Mr. H. F. Oppenheimer, Mr. K. Richardson and Mr. D. A. B. Watson.

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LOW-HEAD Screens

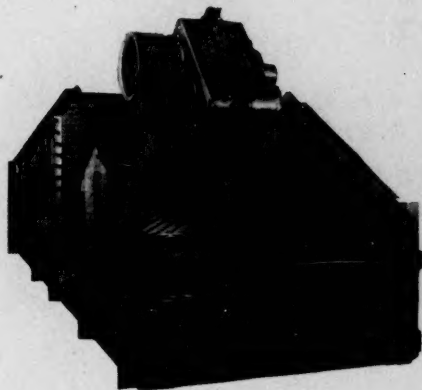
are now also

Built in England . . .

Construction

Look at construction first—it has a lot to do with low maintenance and long screen life. Allis-Chalmers builds LOW-HEAD vibrating screens of long lasting heavy designs. All welded parts are "stress-relieved," eliminating local stresses caused by welding. Vibrating mechanism is independently and conveniently located on top of the screen—out of the way. Its gears and bearings operate in oil-and-dust-tight housing.

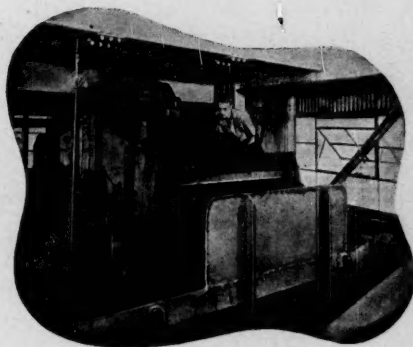
Another important feature of the LOW-HEAD screen is the cloth support frame designed to tension screen cloth properly. An increased number of supports and correct crown for different surfaces result in longer screen cloth life. Decks can also be designed for wedge-wire panels.



Performance

How it works is an equally important measure of screen value. The compact LOW-HEAD vibrating screen operates horizontally—saves valuable headroom and space. It can be used for either wet or dry screening . . . for dewatering . . . or as medium drain and wash screens in heavy density separations.

Straight-line motion at 45° to the horizontal results in rapid stratification of feed and a definite conveying action of the material. LOW-HEAD screens built in England range in sizes from 3ft. x 10ft. to 6ft. x 16ft. with one or two decks. For more details ask for bulletin 07B6330A. For your application needs call or write.



LOW-HEAD is an Allis-Chalmers Trade Mark.

ALLIS-CHALMERS MANUFACTURING COMPANY,
728 Salisbury House, London Wall, London, E.C.2.

'phone: MONarch 0186

ALLIS



CHALMERS